RESILIENT SWITCHING DEVICE

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a resilient switching device provided with a laminated resilient contact piece characterized in deflecting to one side normally to thereby contact with or depart from an electrically conductive piece and accordingly perform an ON/OFF switching operation.

2. The Prior Arts

[0002] A power-switching device is usually built to perform ON/OFF switching operation of an electric power, of which a lower production cost is always the next goal for the makers to pursue.

[0003] The technique of switching device is well known, for example US patent Nos. 4,167,720, 4,937,548, 5,223,813, 5,451,729, and 5,558,211. However the known technique suffers the following disadvantages:

[0004] (1) The known technique requires a great number of parts and thus a complicated structure, resulting in ease of malfunction.

[0005] (2) The great number of parts may result in delay in response time, which is disadvantageous to operation safety especially in overloading.

[0006] (3) The great number of parts causes reduction in production efficiency and increases costs.

SUMMARY OF THE INVENTION

[0007] In view of the defects mentioned, the primary object of the present invention is to provide a resilient switching device having a resilient contact piece characterized in deflecting and positioning on a constant side normally, or on another

side by an external force to hence result two conductive contacts in connection or disconnection, and accordingly effect an electric "ON" state or "OFF" state.

[0008] Another object of the present invention is to provide a resilient switching device, which can be built easily with simple parts and relatively low cost.

[0009] Yet another object of the present invention is to provide a resilient switching device, in which a resilient contact piece that can jump to escape freely without being hindered by any parts is capable of responding in real time to an overload for enhancing security of using electric power.

[0010] In order to realize the above-mentioned objects, a resilient switching device constructed in accordance with the present invention comprises a casing, at least two electrically conductive pieces, and a resilient contact piece. An elastic strip having a turning zone is always deflected to a predetermined side normally and one end of the resilient contact piece is fixed at a top end of one of those electrically conductive pieces while the other end is a free end having a conductive contact corresponding to another conductive contact of another electrically conductive piece.

[0011] When a first lateral face of the resilient contact piece is pushed, the resilient contact piece is driven to bend toward a second lateral face to turn on ("ON") an electric circuit, and vice versa to turn off ("OFF") the electric circuit.

[0012] For more detailed information regarding advantages or features of the present invention, at least an example of preferred embodiment will be described below with reference to the annexed drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The related drawings in connection with the detailed description of the present invention to be made later are described briefly as follows, in which:

[0014] Figure 1 is an exploded view of a resilient switching device constructed in accordance with the present invention;

[0015] Figure 2 is a cross-sectional view showing the resilient switching device the present invention in "ON" state;

[0016] Figure 3 is a cross-sectional view showing the resilient switching device of the present invention in "OFF" state;

[0017] Figure 4 is a cross-sectional view showing the resilient switching device of the present invention, in which a first circuit is in "ON" state; and

[0018] Figure 5 is a cross-sectional view showing the resilient switching device of the present invention, in which a second circuit is in "ON" state.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0019] With reference to the drawings and in particular to Figures 1-3, a resilient switching device constructed in accordance with the present invention comprises a casing 1, at least two electrically conductive pieces 2, 3, a resilient contact piece 4, and a depression key 5. The casing 1 is hollow and defines an interior space in which a rod member 10 mounted to an inner wall of the casing 1. First and second slots 11, 12 are defined in a bottom wall of the casing 1. A recess 13, 14 is formed respectively in top and bottom wall of the casing 1.

[0020] The conductive pieces 2, 3 are substantially inverted L-shaped, which extend through the first and second slots 11, 12, respectively, with ends projecting beyond the casing 1. In addition, a conductive contact 31 is attached to the conductive piece 3.

[0021] The resilient contact piece 4 is an elastic strip having a turning zone 40. The resilient contact piece 4 is always deflected to a predetermined side normally. One end of the contact piece 4 is fixed to a to end of the conductive piece 2 by a rivet

42. Alternatively, the contact piece 4 can be welded to the conductive piece 2. The other end of the contact piece 4 is a free end on which a conductive contact 41 is mounted and corresponding in position to the conductive contact 31 of the conductive piece 3.

[0022] The depression key 5 comprises a rod forming a gap 51 in a middle portion. Upper and lower end faces of the gap 51 are tapered to clamp the contact piece 4 therebetween. Two ends of the depression key 5 extend through the recesses 13, 14 of the casing 1 whereby the depression key 5 is movable with respect to the casing 1 by being guided by the recesses 13, 14.

[0023] Referring to Figure 2, in an "ON" state, the turning zone 40 of the resilient contact piece 4 is turned downwards so that the resilient contact piece 4 is deflected downwards with the conductive contact 41 engaging the conductive contact 31 to form a closed loop.

[0024] When depression key 5 is depressed, the gap 51 that clamps the resilient contact piece 4 displaces downwards. At this moment, the tapered upper end face of the gap 51 props down the turning zone 40, making the resilient contact piece 4 concave upward, so that the conductive contact 41 warps up and disengage from the conductive contact 31 thereby opening the loop, as shown in Figure 3. Under the "OFF" state as indicated in Figure 3, by pushing the depression key 5 upwards, the resilient contact piece 4 clamped in the gap 51 is moved upwards while the free end thereof is stopped by the rod member 10 in the casing 1 to hence result in a warp up of the turning zone 40 of the resilient contact piece 4 by the associated upward-going tapered lower end face of the gap 51 and a downward-going of the contact piece 4 that makes the conductive contact 41 engaging the conductive contact 31 to return back to the "ON" state.

[0025] The resilient contact piece 4 can be made of an alloy having the characteristics that deflects to one side in normal temperature and bends to the other side at a temperature beyond a threshold temperature. In the embodiment illustrated, the contact piece 4 always bends down normally. In the "ON" state shown in Figure 2, when overloading happens, which heats up the resilient contact piece 4 over the threshold temperature, the resilient contact piece 4 deforms upwards so that the conductive contact 41 at the free end of the resilient contact piece 4 disengages from the conductive contact 31 through an upward bounce of the turning zone 40 to thereby enter the "OFF" state as shown in Figure 3.

[0026] Also referring to Figures 4 and 5, a second embodiment of the present invention is shown, in which a first circuit is in "ON" and "OFF" state, respectively. A conductive piece 6 that is substantially an inverted L-shape plate is received in the casing 1 with one end extending outside the casing 1. A conductive contact 61 is fixed to another end of the conductive piece 6.

[0027] When the depression key 5 is depressed at either one of the ends thereof, the resilient contact piece 4 clamped at the gap 51 is moved upwards or downwards, and the tapered upper and lower end faces of the gap 51 prop against the turning zone 40 of the resilient contact piece 4 to result in engagement between the conductive contact 41 and the conductive contact 31, or between the conductive contact 41 and the conductive contact 61 to thereby effect an electric "ON" state of a first or a second circuit.

[0028] In the above described, at least one preferred embodiment has been described in detail with reference to the drawings annexed, and it is apparent that numerous changes or modifications may be made without departing from the true spirit and scope thereof, as set forth in the claims below.